



US009409172B2

(12) **United States Patent**
Shinoda et al.

(10) **Patent No.:** **US 9,409,172 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **MICROCHIP AND CHANNEL STRUCTURE
FOR THE SAME**

15/1404 (2013.01); G01N 35/10 (2013.01);
G01N 2015/1037 (2013.01);

(Continued)

(71) Applicant: **Sony Corporation**, Tokyo (JP)

(58) **Field of Classification Search**

(72) Inventors: **Masataka Shinoda**, Tokyo (JP); **Toru
Takashimizu**, Kanagawa (JP)

CPC G01N 35/10; G01N 2015/149; G01N
15/1404; G01N 2015/1406; G01N 2015/1409;
G01N 2015/1037; G01N 15/10; B01L
3/502776; B01L 3/502761; B01L 3/502784;
B01L 2200/0652; B01L 2200/0673

See application file for complete search history.

(73) Assignee: **Sony Corporation**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(56) **References Cited**

U.S. PATENT DOCUMENTS

(21) Appl. No.: **14/250,003**

3,649,829 A 3/1972 Randolph
4,756,427 A 7/1988 Gohde et al.

(22) Filed: **Apr. 10, 2014**

(Continued)

(65) **Prior Publication Data**

US 2014/0216179 A1 Aug. 7, 2014

FOREIGN PATENT DOCUMENTS

Related U.S. Application Data

DE 102 060 083 8/2003
EP 1 481 723 12/2004

(63) Continuation of application No. 12/435,160, filed on
May 4, 2009, now abandoned.

(Continued)

OTHER PUBLICATIONS

(30) **Foreign Application Priority Data**

Japanese Office Action issued Jun. 29, 2010 for corresponding Japa-
nese Patent Application No. 2008-288896.

May 13, 2008 (JP) 2008-125946
Aug. 1, 2008 (JP) 2008-199585
Nov. 11, 2008 (JP) 2008-288896

(Continued)

Primary Examiner — Jennifer Wecker

(74) *Attorney, Agent, or Firm* — K&L Gates LLP

(51) **Int. Cl.**

B01L 3/00 (2006.01)

G05D 7/06 (2006.01)

(Continued)

(57)

ABSTRACT

A microchip includes a channel permitting a sheath liquid to
flow therethrough; and a microtube for introducing a sample
liquid into a laminar flow of the sheath liquid flowing through
the channel; wherein liquid feeding is performed in the con-
dition where a laminar flow of the sample liquid introduced
through the microtube is surrounded by the laminar flow of
the sheath liquid.

(52) **U.S. Cl.**

CPC **B01L 3/502761** (2013.01); **B01L 3/502776**
(2013.01); **B01L 3/502784** (2013.01); **B01L**
2200/0647 (2013.01); **B01L 2200/0652**
(2013.01); **B01L 2200/0673** (2013.01); **B01L**
2300/0645 (2013.01); **B01L 2300/0861**
(2013.01); **B01L 2400/02** (2013.01); **G01N**

13 Claims, 10 Drawing Sheets

